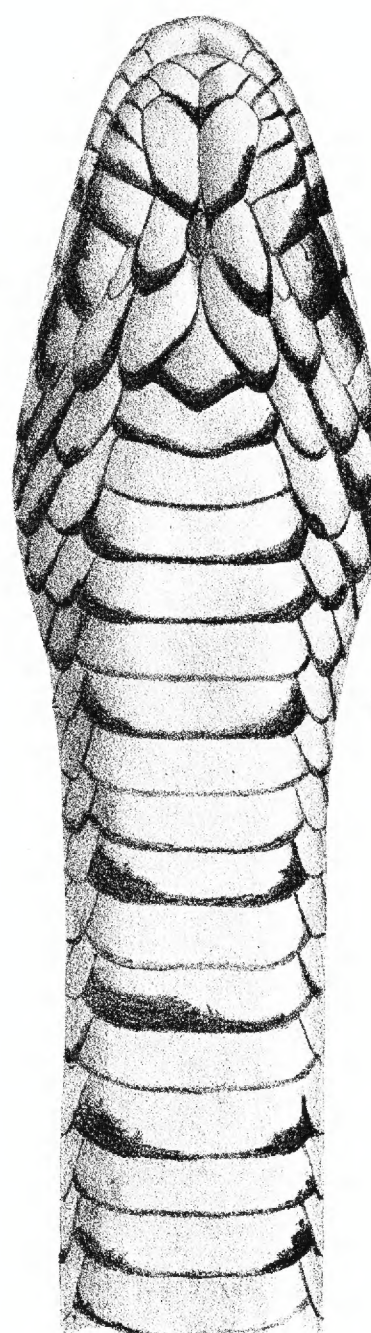
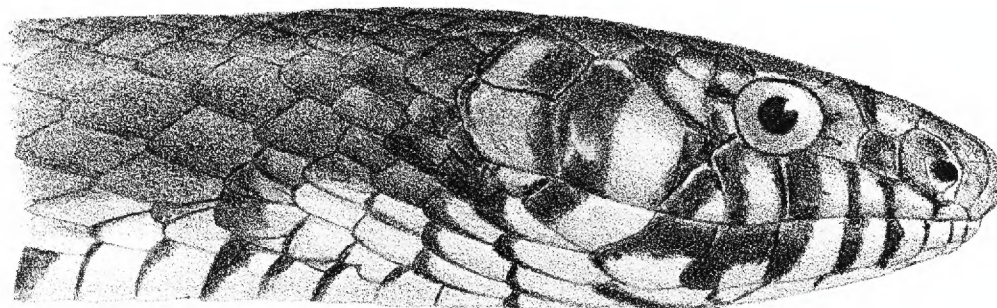

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BULLETIN OF THE CHICAGO HERPETOLOGICAL SOCIETY

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Associations between Dekay's Brownsnake, <i>Storeria dekayi</i> , and Invertebrates	Brian S. Gray	25
Use of a Discarded Tire as Cover by Larval Spring Salamanders (<i>Gyrinophilus porphyriticus</i>)	Sean M. Hartzell	28
Book Review: <i>Snakes of the Southeast, Revised Edition</i> by Whit Gibbons and Mike Dorcas	Jeffrey C. Beane	29
The Road Warrior	Roger A. Repp	31
Herpetology 2016		38
Unofficial Minutes of the CHS Board Meeting, January 15, 2016		42
News and Announcements: 2016 CHS Grant Recipients		43
Advertisements		44

Cover: Tiger ratsnake, *Spilotes pullatus*. Drawing (as *Spilotes megalolepis*) from *Catalogue of the Snakes in the British Museum (Natural History). Volume II., Containing the Conclusion of the Colubridae Aglyphae* by George Albert Boulenger, 1894.

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Associations between Dekay's Brownsnake, *Storeria dekayi*, and Invertebrates

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Species do not occur in isolation, but are associated and interact with many other plants and animals in their environment. Some of these relationships are obvious, such as those between predator and prey or between parasite and host. Others however, are more obscure and infrequently noted. Herein I report observations of Dekay's Brownsnake, *Storeria dekayi* and invertebrates at a site in Erie, Pennsylvania, USA. The site and its herpetofauna have been described previously (Gray, 2014a).

Ants—Several species of small snakes, including Dekay's Brownsnake, may use ant nests as hibernacula (Noble and Clausen, 1936; Carpenter, 1953; Pisani, 2009). During spring at my Erie County site, Dekay's Brownsnakes have been found in proximity to ant nests. However, even though it is suspected, I have not been able to determine if Dekay's Brownsnakes at this site utilize ant nests as hibernacula. Associations outside the inactive period of hibernation have been noted. On 13 June 2014 a Dekay's Brownsnake was observed near a colony of the European Fire Ant, *Myrmica rubrum*, with one of the ants walking on the snake (Figure 1). Dekay's Brownsnakes and unidentified ants have been seen in proximity on a couple of other occasions (Gray, 2014b). In all cases where ants and Dekay's Brownsnakes have been found together at my site, there did not appear to be any attempt by the ants to attack the snakes.

Millipedes—Millipedes (Diplopoda) are relatively common inhabitants of moist biotypes in the upper horizons of litter in broadleaf mesic forests (Hoffman, 1990). They may also be found beneath damp cover (e.g., boards, logs and rocks) in more open areas such as fields. Due to their susceptibility to desiccation, millipedes aggregate beneath moist cover objects (Barker, 2004) where they may be found with Dekay's Brownsnakes (Figure 2). It is likely that both millipedes and Dekay's Brownsnakes select the same shelters for similar reasons, such as moisture and protection from predation. Also, millipedes may be numerous beneath cover that also harbors prey of Dekay's

Brownsnakes (i.e., slugs and earthworms) (Figure 3). In such situations millipedes may adhere to slugs or earthworms and be ingested by Dekay's Brownsnakes during predation (Gray, 2013a). In a sample of 84 scats from 74 Dekay's Brownsnakes, millipede fragments (Figure 4) were observed in six (Gray, 2013b). All identifiable fragments were identified as belonging to the Spotted Snake Millipede, *Blaniulus guttulatus*.

While millipedes are primarily detritivores, a few species feed on animal carrion, and some are known to be preferential carnivores (Hoffman, 1990; Barker, 2004). I observed aggregations of Spotted Snake Millipedes (*B. guttulatus*) on the carcasses of Dekay's Brownsnakes on two occasions (Figure 5). I have also found these millipedes in and around the mouth of a dead adult Milksnake, *Lampropeltis triangulum* (Gray, 2015a). Incidentally, a large aggregation of Spotted Snake Millipedes was observed on and around a dead Dusky Arion, *Arion subfuscus*, a nonnative slug. Millipedes may use animal carcasses for a source of nutrition or moisture. Millipedes will feed on the shed skins of snakes (Gray, 2005) including Dekay's Brownsnakes (Figure 6).

Mollusks—Snails and slugs may be the best known invertebrates to be associated with Dekay's Brownsnakes, primarily as prey. The exotic slugs, *Arion hortensis* complex, *Deroceras laeve*, *D. reticulatum*, and *Limax* sp. have been reported as prey of Dekay's Brownsnake (Gaul, 2008; Gray, 2014c). The Dusky Arion, *A. subfuscus* is abundant at my Erie County site (Figure 7), but does not appear to be preyed upon by Dekay's Brownsnakes. The Dusky Arion is a medium-sized (up to 70 mm in length) slug that is common and well-established in North America (Grimm et al., 2009). The relatively large size and particularly sticky mucus of these slugs may be an effective deterrent to predation by Dekay's Brownsnakes. Snails of the genus *Succinea* are known to be preyed upon by Dekay's Brownsnakes (Gray, 2015b). Small snails or their empty shells



Figure 1. Dekay's Brownsnake with a European Fire Ant, *Myrmica rubrum*, crawling on it.



Figure 2. Dekay's Brownsnake in proximity to a millipede. A slug, *Arion subfuscus*, is also in the image (lower center).

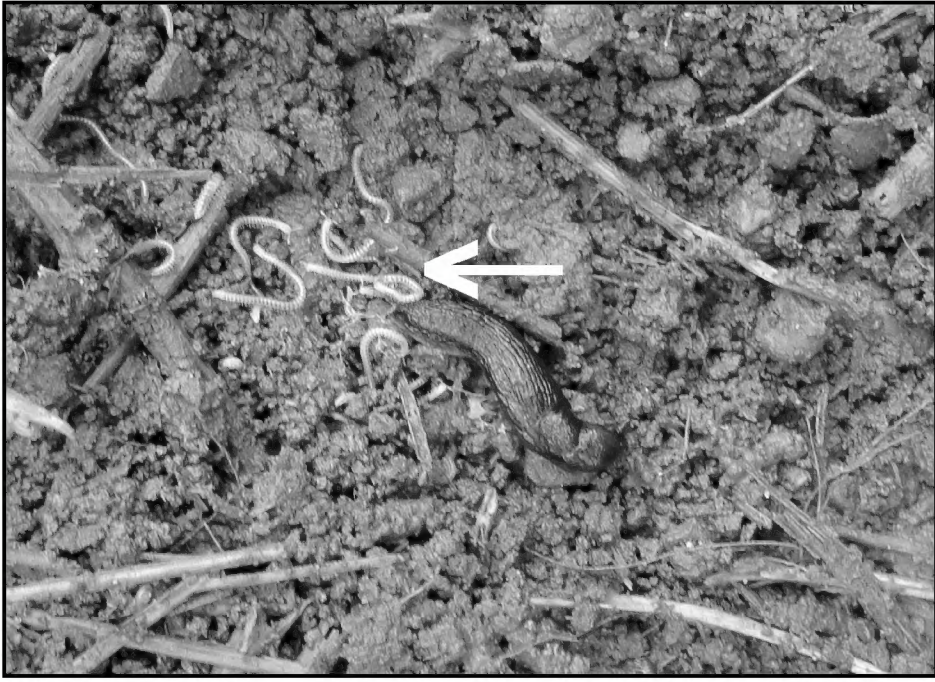


Figure 3. Slugs of the *Arion hortensis* complex are frequently found beneath cover with Dekay's Brownsnakes. The arrow points to several millipedes, which may also be found with Dekay's Brownsnakes.

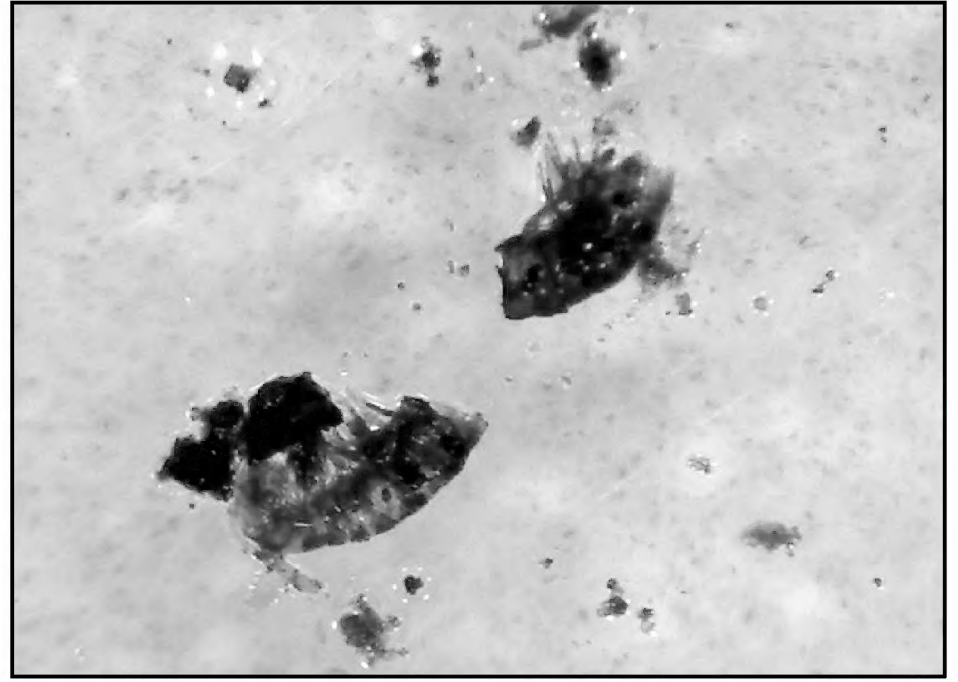


Figure 4. Millipede fragments found in a fecal sample of a Dekay's Brownsnake.



Figure 5. Millipedes on Dekay's Brownsnake carrion.

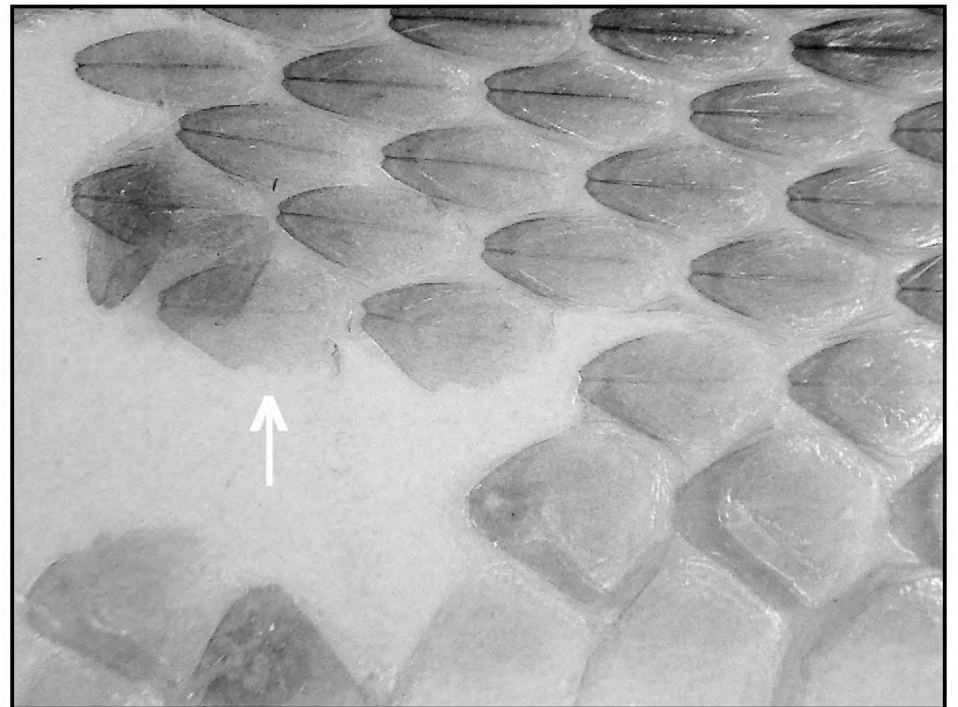


Figure 6. A fragment of shed skin from a Dekay's Brownsnake, showing damage (arrow) caused by millipedes.



Figure 7. Three Dusky Slugs, *Arion subfuscus*, found beneath a cover object with a Dekay's Brownsnake.

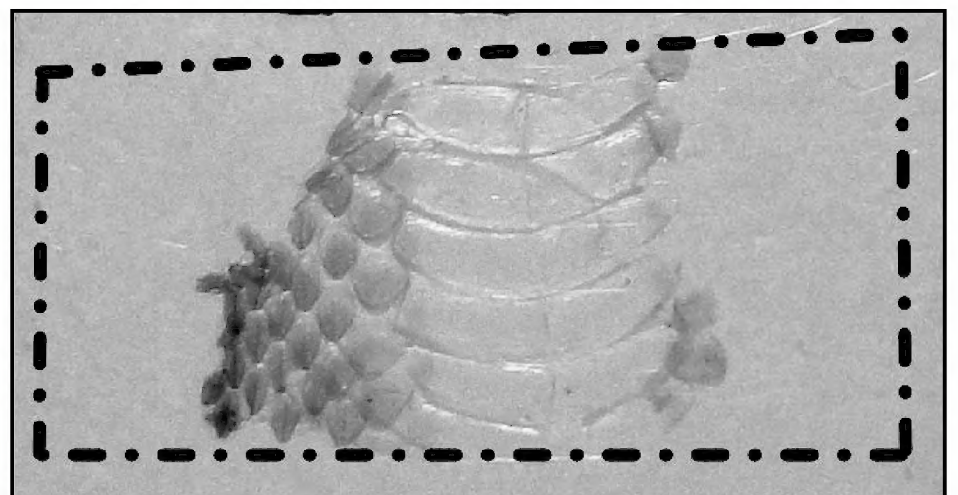


Figure 8. Damage to a Dekay's Brownsnake shed skin as a result of Sowbugs feeding on it. The dotted outline illustrates the original size of the shed skin sample.

may be incidentally consumed during ingestion of a larger slug, snail, or earthworm. For example, a 4.5 mm shell from a glossy pillar, *Cochlicopa lubrica* found in a Dekay's Brownsnake fecal sample (Gray, 2014c) was more than likely consumed when it adhered to a larger prey item.

Earthworms—Earthworms are frequently found beneath cover with Dekay's Brownsnakes, which may prey upon them. While several species have been documented from my site, including *Allolobophora chlorotica*, *Amyntas* sp., *Apporrecto-daea* sp., *Lumbricus rubellus*, and *L. terrestris*, only *L. rubellus* has been identified as a prey item (Gray, 2013a). Earthworms (e.g., *L. terrestris*) may use the shed skins of snakes, including *S. dekayi*, to plug the entrance of their borrows (Gray, 2005).

Parasites—Endoparasitism in Dekay's Brownsnake seems to be low. In my study, only four of 84 fecal samples contained immature nematodes. Judd (1954) found nematodes (*Rhabdias fuscovenosa*?) in three of 10 *S. dekayi* from London, Ontario. Pisani (2009) examined six scats of *S. dekayi* from Kansas, and observed rhabditiform larvae in one of them. Ernst and Ernst (2006) list *Cosmocercoides dukae*, *Rhabdias fuscovenosa*, *R. vellardi*, and *Rhabdias* sp. as parasitizing Dekay's Brownsnake.

Mites—Mites such as *Ophionyssus natricis* and *Trombicula* sp. may be parasitic on Dekay's Brownsnake. Ernst (2003)

found mites under the scales of 41 of 702 *S. dekayi* examined from two southeastern Pennsylvania sites. Mite infestation in these two Pennsylvania populations was assumed to be low. Some mites may also be incidentally consumed by Dekay's Brownsnakes (Gray, 2013b). The size (0.2–0.7 mm) of the mites found in *S. dekayi* fecal samples makes it highly unlikely that they were prey of the snakes.

Sowbugs and pillbugs—These isopods are omnivorous and may be useful scavengers (Cloudsley-Thompson, 1968) in the moist habitats in which they are found. Sowbugs (e.g., *Porcellio* sp.) and pillbugs (*Armadillidium* sp.) will consume shed snake-skins (Gray, 2005) (Figure 8). Referring to populations on South Bass Island in Lake Erie, Langlois (1964) stated that Dekay's Brownsnakes feed on sowbugs and slugs. In my study of the diet of Dekay's Brownsnakes (Gray, 2013a, b), no sowbug remains were found in any of the samples, despite their abundance at the site. Jass and Klausmeier (2000) list 8 terrestrial isopod species as having been documented in Pennsylvania.

It is certain that there are many, many other associations between Dekay's Brownsnakes and invertebrates awaiting discovery, and it is hoped that this paper will inspire others to document and report them.

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Use of a Discarded Tire as Cover by Larval Spring Salamanders (*Gyrinophilus porphyriticus*)

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Debris discarded by humans (anthropogenic debris) can be used as a source of cover for a variety of herpetofauna. In this case, anthropogenic debris mimics the microhabitat found beneath natural cover objects and thus provides shelter comparable to that of natural cover (Willson and Gibbons, 2009). Eastern Hellbender salamanders (*Cryptobranchus alleganiensis*) have been reported to occasionally use anthropogenic debris such as discarded cans and plastic sheeting within streams as cover (Nickerson and Mays, 1973; Jasinski and Moscato, 2014). However, few other reports are available in the literature regarding the usage of unintentional anthropogenic debris (i.e., man-made debris other than cover boards intentionally placed for research) as cover by aquatic salamanders. Herein, I report an instance of larval Spring Salamanders (*Gyrinophilus porphyriticus*) utilizing anthropogenic debris as cover.

On 24 December 2015 at 1200 h, I observed three larval *G.*

porphyriticus sheltering beneath a large discarded tire (ca. 90 cm in diameter) within a small, unnamed spring in Hopewell Memorial Park, Montour County, Pennsylvania, USA (40.958670°N, 76.577660°W [WGS 84]). Two of the larvae were of similar size (ca. 100 mm total length) while the third individual was of a smaller size class (ca. 45 mm total length). Upon detection of the larval salamanders, the tire was restored to its initial position to minimize any disturbance to *G. porphyriticus* habitat and the larvae were returned underneath the tire. Larval *G. porphyriticus* inhabit springs, seepages and creeks for approximately 3–4 years before metamorphosis and typically reside underneath natural cover objects such as logs or large stones or burrow into loose gravel (Petranka, 1998). Grover (2006) found that *G. porphyriticus* typically occupied natural cover objects larger in size than other stream salamander species. In this case, the tire may have provided appropriate habitat for *G. porphyriticus* in part due to its large size.

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**Book Review: *Snakes of the Southeast, Revised Edition* by Whit Gibbons and Mike Dorcas
2015. viii + 266 pp. The University of Georgia Press (www.ugapress.org).
ISBN-978-0-8203-4901-5. Flexible cover. US\$28.95.**

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It's hard to believe that 10 years have passed since the first edition of this book came out. The first edition (Gibbons and Dorcas, 2005) was the first in a series of five books published by the University of Georgia Press, all similarly formatted, on the herpetofauna of the Southeast (Gibbons and Dorcas, 2005; Buhlmann et al., 2008; Dorcas and Gibbons, 2008; Gibbons et al., 2009; Mitchell and Gibbons, 2010). This second edition closely follows the format of the first edition and the other volumes in the series, and covers the same nine-state region (Virginia, Tennessee, the Carolinas, Georgia, Florida, Alabama, Mississippi and Louisiana) defined as the Southeast in the other volumes. Like the others in this series, it was written with a broad and general readership in mind, but it will also prove highly useful to professional herpetologists and seasoned naturalists.

Species accounts are included for 57 (53 native and four introduced) snake taxa treated as species from the region. Each account is divided into sections on "Description," "What do the babies look like?," "Other names" (for some species, where applicable), "Distribution and habitat," "Behavior and activity," "Food and feeding," "Reproduction," "Predators and defense," "Conservation," and "Scientific nomenclature" (for some species, where applicable). Each also contains several photographs, shaded distribution maps of the species' range within the region as well as its overall range, and a sidebar with quick identification tips. In addition, the book includes a thorough introductory section, a glossary, a quick-reference table of species found in each state, a list of further reading, indices of scientific and common names, and a closing section on human-snake interactions. The pages throughout are punctuated with "Did you know?" sidebars featuring interesting facts on snakes. The book carries a strong conservation message throughout, and I have only praise for this conservation-oriented approach.

This second edition differs very little from the first. It is 13 pages longer. Many of the species accounts are virtually identical to those in the first edition, but several include minor updates or other changes. The main difference is the addition of species accounts for three species: Kirtland's snake (*Clonophis kirtlandii*), which was first reported in Tennessee in 2012; and boa constrictor (*Boa constrictor*) and North African python (*Python sebae*), both of which are now known to be established and breeding in small areas of Florida. The section on introduced species has been expanded. Some scientific nomenclature has been changed to reflect more recent usages for some species: *Drymarchon corais* to *D. couperi* for eastern indigo snake, *Elaphe obsoleta* to *Pantherophis obsoletus* for ratsnakes, *E.*

guttata to *P. guttatus* for corn snake, *Stilosoma extenuatum* to *Lampropeltis extenuata* for short-tailed snake, and *Virginia*

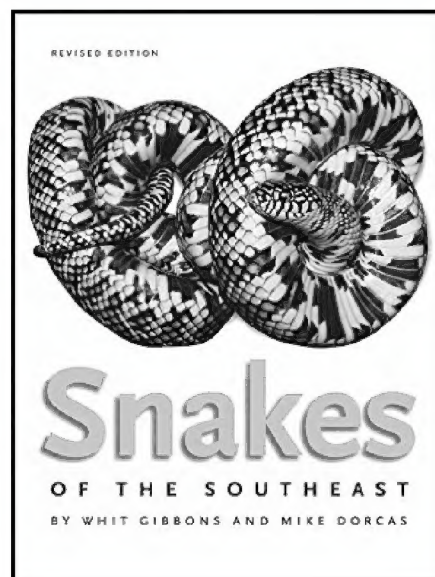
striatula to *Haldea striatula* for rough earthsnake.

A few words about taxonomic controversies are included in the introductory section. Several common names have also been changed from the first edition. These include brown snake to brownsnake; worm snake to wormsnae; ringneck snake to ring-necked snake, eastern garter snake to common gartersnake, ribbon snake to ribbonsnake, and rat snake to ratsnake. Yet green snake, pine snake, swamp snake, queen snake, corn snake, mud snake, blind snake, coral snake, scarlet snake, rainbow snake, crayfish snake, and indigo snake are retained as two-word names. If any explanation was offered for these particular changes, I missed it. For me,

appropriate common names for reptiles and amphibians became much more confusing with the publication of Crother (2000), which, although aimed at standardizing common names, included many proposed names that had never been widely used (or used at all), and that were, in some cases, quite unpopular. Subsequent editions of that publication, along with a proliferation of herpetological publications that used some of those names but not others (usually based on authors' personal preferences), only added to the confusion. Common names will, of course, never be universally agreed upon, but a few detail-oriented people like me long for standardized names that at least most persons are familiar and content with. Personally, I found life simpler when the "Herp Bible" (at least for the U.S.) was always the latest edition of Conant (1958, 1975) or Conant and Collins (1991, 1998), and I always referred to those field guides for common names. Having said all that, there is really little or no doubt what species are being referred to in the accounts in this book.

Personally, I don't care much for the organization of the species accounts. They are organized into "Small Terrestrial Snakes," "Mid-sized Terrestrial Snakes," "Large Terrestrial Snakes," "Watersnakes," "Venomous Snakes," and "Introduced Species." I prefer the more typical arrangement of most field guides (phylogenetic or alphabetical by genera and species within families), mostly because that is what I am accustomed to, and also because of the subjectivity of the other categories (e.g., one might be uncertain whether to look for things like green snakes and scarlet snakes under "Small Terrestrial Snakes" or "Mid-sized Terrestrial Snakes"—they are grouped with the latter in this book).

The more than 300 color photographs range in quality from adequate to excellent. Virtually all serve their purpose of show-



casing snake beauty and diversity, pointing out important identification features, and illustrating intraspecific variation. This last is an especially important feature—too many publications include only a single photograph or illustration of each species featured and fail to adequately cover the often extensive range of variation exhibited by most species. Nearly all species in this book are illustrated by multiple photographs (the rim rock crowned snake and North African python are allowed only one each, but as many as 17 are included within the account for variable species like the ratsnake complex). The great majority of the photographs are the same ones included in the first edition, but some of those have been replaced, and others have been repositioned or resized within the accounts. Where the same photos are used, the colors vary slightly in the new edition, tending overall to be slightly darker than in my copy of the first edition. The result is that I think some photos may look slightly better or sharper in the new edition, whereas others may look better (brighter colors) in the first edition.

Most of the few errors I noticed, I would regard as minor.

For example, the rough earth snake is not included in the index, either under *Haldea* or *Virginia*; and in the caption on page 58, “snake” should be “snakes” and there should be a period at the end of that sentence. Some of the range maps are slightly inaccurate. The map for the queen snake shows some isolated populations in the Coastal Plain of North Carolina and Virginia that, to my knowledge, don’t exist. The pine woods snake map similarly includes an isolated area of shading in extreme northeastern North Carolina, where the species has never been reported.

At 7¼" x 10¼", the book’s size may hinder its use somewhat as a field guide, but the flexible cover may compensate enough for it to fit into a backpack or otherwise be more easily transported than would a hardback of the same dimensions.

Overall, this volume is a decent update to the first edition. As the only published work covering exclusively the snakes occurring in the nine-state Southeast region, it will be a valuable addition to the library of anyone interested in the natural history of that region.

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The Road Warrior

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This author would like to start this column off by talking about you. Not really you personally—but stick around, that day may come. No, I’m going to talk about the usage of the word “you” in any manuscript. It is considered bad writing form to use the word “you” by those who are your basic grammar police. Any editor worth their salt will savagely attack any author hapless enough to use that awful word *you* in their text. This author is no different. Whenever I assume the role of editor, I too side with the grammar police, and often launch into diatribes on the usage of the word “you.” “*You* can’t say you! Where did *you* learn your grammar skills, the Sears Roebuck Skool of proper English? If all else fails, use *the reader* instead of *you*.” For many years, this author has followed this rule to the letter. *You* is bad form. *You* is out. *The reader* is in.

For once, this author is going to use the word *you* liberally throughout this article. When I address *you*, I am addressing the he or she who is doing the reading. In other words, I am talking to *you*, the unfortunate reader of these words. Both of you! (Your sins in either this or a past life must have been considerable to have to endure this sort of punishment). If any well-meaning person tries to edit the *you* out of these words, they are going to get a certain four letter word that often prefaces *you*. Leave my ewes alone—*you*.

Having gotten the formalities out of the way, I lead off with a question: Have you ever been road cruising for herps? If no, the next question will not apply to you. If yes, have you ever found a snake DOR (Dead On Road)? If so, did you ever wonder about the events that might have led up to the unceremonious death of that particular animal? Doubtful! Most likely, you threw it off the road without further regard, and continued on your way. There is nothing shameful in that action; it is what we normally do. “Gawd! It’s just another dead atrox. Get it off the road, and let’s keep going.”

A paved road through any desert setting is a two-edged sword. Those of us who cruise such roads think of them as a convenient way to find herps. Most of us also know that a paved road means death a thousand times over for any herp hapless enough to try crossing it. But a paved road can also be a blessing. While no two paved roads are exactly alike, they all carry a common feature. We speak of the crowning created to allow water to flow off to either side. If you are ever driving a road in the desert by day, note that for roughly 20 feet to either side, the vegetation is much thicker than the areas surrounding. That is because the strip adjacent to either side of the road receives more water, due to the crown creating runoff. A paved road creates an oasis of sorts. This in turn allows for more vegetation, which in turn attracts wildlife of all sorts, including insects, rodents, and snakes. Hence, a paved road is in essence a gift to any area that it passes through. A paved road has its attractions. It is the vehicles that utilize the road that create the hazard. In short, the road giveth, and the road taketh away. If you are herp, and you live by the road, you might also die by the road. Those

of you who stick with this particular column to the end will understand why we speak of paved roads.

As suggested in previous columns, for nearly 15 years, under the generalship of Dr. Gordon Schuett, this author has been utilizing radio-telemetry to follow rattlesnakes and Gila Monsters around. The study began in March of 2001, in a remote mountain range north of Tucson called the Suizo Mountains. In the early goings, we worked a small outlier hill that we named Iron Mine Hill. For those unfamiliar with the radio-tracking process, a brief explanation is in order. A small transmitting device is surgically implanted inside the rattlesnake or Gila Monster. By utilizing a receiver and antenna, one is able to follow the subject around with pin point accuracy. In other words, the subject can run, but it can’t really hide. Despite ridiculous claims by others to the contrary, it is impossible to know with scientific accuracy exactly what any given subject may be doing year round without this technology.

Since it will come up soon, this author has also utilized one other modern technology to assist in identifying individual animals. We speak of microchips, AKA Passive Integrated Transponders, or more simply put, PIT tags. The PIT tag does not allow one to follow a subject around, but it does allow one to ascertain with scientific certainty the identity of the subject in hand—if that subject has previously been injected with one. PIT tags are used extensively in mark and recapture studies. As transmitters cost roughly \$400.00 each, and PIT tags are \$6.00 each, the latter process is often the only fiscally feasible means to conduct a study.

In early March of 2004, I began collaborating with a young woman named Melissa Amarello. At that point in time, Melissa was just beginning to blossom into a full-fledged rattlesnake aficionado. She was already working for Matt Goode at the Ecology and Evolutionary Biology Department of the University of Arizona, radio-tracking Tiger Rattlesnakes (*Crotalus tigris*) on a local golf course. We agreed to go on a field trip together in order to beat some bushes and see what we could find. The date we selected to do this was 13 March 2004. Initially, I was going to lead her to a wide assortment of rattlesnake dens that all fell under the category of “hands off” dens. By hands off, I mean just that. We would look, but we would not touch anything we found.

Melissa announced at the onset of the trip that she wanted to go someplace where we would actually catch and process any rattlesnakes that we found. Those who know Melissa today would be *greatly* surprised by this, as she is now fiercely against anything but the most minimal intrusions of science with regard to nature. But that is now, and this was then—and then, she wanted a grab fest. There was only one place that I was grabbing and processing rattlesnakes, and that was Iron Mine Hill. Ergo, we went there.

Upon arrival, we completely dismissed all notion of doing

any radio-tracking. We left the gear in my truck, and at first wandered through some of the sweet spots on the lower south side of Iron Mine Hill. While I checked all known localities, Melissa followed me in parallel fashion—as a good guest should. Soon into the walk, she scored an adult male atrox, which was subsequently bagged for future processing. This snake would soon become *Crotalus atrox* #54, or Ca54 in abbreviated form. After an hour of skulking about Iron Mine Hill, we decided to plunge into the Suizo Mountains proper to try our hand. This proved unproductive, and we doubled back to Iron Mine Hill. We split up, agreeing to bag anything that had a rattle at the end of its tail. During our separation, my job in that regard was easy, as nothing with rattles made an appearance. I did find two Sonoran Desert Tortoises (*Gopherus morafkai*) out foraging on the lush vegetation brought on by the generous rains that occurred in the winter of 2004. The foraging method of the second tortoise impressed me so much that I stopped to watch it for over an hour. It was zeroing in on the blue bonnets, head swinging from side-to-side as it advanced forward, mowing them down and choking them down with great efficacy. It was by far the most prolific feeding frenzy by a herp cow that I have ever witnessed. A great many lupines were converted to tortoise mass this day, and glad I was to watch it happen.

At the appointed time, I arrived back at the truck to see two snake bags laid out on the ground by the passenger door of my truck. Each bag was showing telltale signs of movement within, and I knew in an instant that Melissa had scored. Moments later, Melissa popped over the rise and began her descent, with yet another writhing bag in hand. As she approached, she asked “Where are yours?”

She was kind of a poopsock about my report of watching the grazing tortoise when, in her estimation, I should have been collecting rattlesnakes. Her scolding had all the effect of passing gas in a windstorm, as I was happy with what I found. As she has yet to sign any paychecks with my name on it, she can think what she wants about me. But, in all fairness, she had kicked my ass in the rattlesnake department. By this point in time, I was growing used to everybody else finding more rattlesnakes than me. It is a pattern that I have grown accustomed to in my old age, and it serves me well to not worry about *girls* finding more snakes than me. Good on ‘em, I say. Makes them feel useful, it does. They need that every once in a while . . .

Bag number one was opened, and I gazed down into the three foot depth of supple whiteness to behold a young adult male atrox. Without further fanfare, the bag was knotted shut. (After all, it was just another atrox). Bag number two was likewise opened, and I gazed into the fluffy white maw to see an adult female atrox coiled at the bottom. Once again, without fanfare, the bag was knotted shut. Both rattles in both bags were now singing away, their symphony setting the stage for the opening of the third bag that Melissa had just brought forth. This one contained a Tiger Rattlesnake, which was immediately poured onto the ground for closer inspection.

With one look at her stunning orange-colored flanks, distal plumpness, and narrow short tail, we ascertained her to be a female, and a pregnant one at that. The full up processing that ensued later that evening revealed that she was 635 mm (25

inches) snout-vent length, a tail that was 43 mm (1.7 inches), and a rattle count of basal plus 8 rattles. The rattle was highly tapered to the point to where the only missing segment was the button. Her mass was a whopping 285 g, or roughly 10 ounces. This was indeed a sweet young thing, a real dandy, and excited I was to have her in the study. Our new tiger was extremely cooperative with the process of re-bagging, she actually crawled back into the bag herself!

It next became time for Melissa to show me where these snakes had come from, in order to expedite the post-processing release. I was greatly surprised by the location of the atrox pair. They were near the top northeast quadrant of Iron Mine Hill, the coldest part of the hill. They had been coiled together beneath a lush patch of Trixis and Mormon Tea, at the very top of a massive boulder formation. When Melissa called up a pre-capture image on her digital camera (Figure 1) my eyes came out on stems.

For nearly ten years, I had been trying to photograph an image of atrox involved in a behavior called “stacking.” This behavior was first described by a guy named Jack O’Liele, during an atrox study at Fort McDowell near Phoenix in 1993. But even though Jack was the first person to describe it, he was never able to successfully photograph it. Until this day, neither had anybody else. The very nature of what stacking actually is makes it nearly impossible to photograph.

Simply put, stacking is a form of mate guarding. A female rattlesnake will be coiled tightly on the ground, and a male will coil over top of her in such fashion as the female becomes completely encapsulated by the male’s coiled form. The perfect stack, if photographed, would look exactly like one snake coiled on the ground, with no hint that a female is underneath him. Three times this author has been blessed to see it, but with each of these observations, he witlessly picked the male up thinking he had but one snake to catch. It wasn’t until after the male was snagged that the female beneath him was noticed. While stacking is likely an attempt on the male’s part to hide the female from other male rattlesnakes, the behavior also beguiles the human eye.



Figure 1. In situ image of male Ca55 (top), and female Ca56 (bottom) just prior to capture on 13 March 2004. The pair was engaged in a behavior known as stacking. This may be the only photo of this behavior in existence. See text for details of this and all other images. Image by Melissa Amarello

In Melissa's case, upon her approach with the camera, both snakes spooked ever so slightly, each rising out of their coils a bit. Melissa's well-timed image is the only possible way to show stacking where both snakes are visible with one snap of the shutter. The image in Figure 1 *might* be the only image of stacking available to science at the date of this publication. (But I would be delighted to learn otherwise. Does anybody else have an image of this?).

In order to properly number the pair for our study, I asked Melissa which of the two she caught first. It was the male. Hence, *Crotalus atrox* #55, or Ca55, formally entered our study. As is often the case with new friends, I had no idea what I was dealing with until much, much later. The fact that he was part of the first stacking episode ever to be successfully photographed should have given me a hint.

That night, we processed all four snakes that "Hurricane Melissa" (as she was aptly dubbed by me this day) had found. Whenever I snag a snake--or snakes, from the wild, there is a certain responsibility that goes along with that. The decision to rudely interrupt the daily life of a regal animal like a wild rattlesnake is not taken lightly. When doing this, if I'm in for the dime, I'm in for the dollar. Hence, we knocked those snakes out cold before we even started. That way, one can measure them accurately in every way possible, stab them for a blood sample, jab them to thrust a PIT tag home, get a mass and then move on to the next. One person does the physical manipulations and metrics, the other is the scribe and organizer of the data. Both parties performed their duties flawlessly. There is no other effective way to make it count when processing a wild snake—except for maybe sticking in a transmitter. These four snakes got lucky—as we didn't have any to spare.

The vital stats of Melissa's female Tiger Rattlesnake have already been revealed. The male atrox Ca 54 will not be discussed any further. The stats on Ca55 and Ca56 are worthy of further elucidation. Male Ca55 carried a snout–vent length (SVL) of 760 mm (~30 inches). His tail was 65 mm (~2.6 inches). His rattle count was basal plus 6 segments and a partial 7th, and his mass was 339 g (~12 ounces). Everything that I have learned about atrox would indicate that he was 3.5 years old at the time of this processing. His girlfriend du jour, Ca56, was a much older and larger snake. Her SVL exceeded his by 120 mm (~4.7 inches), her tail length was shorter than his by 2 mm (~0.08 inches), and she was 26 g (~1 ounce) heftier in mass. He was a young atrox just entering his prime of life phase, and she was an older atrox more than willing to tolerate him. As we processed her, we jokingly named her "Mrs. Robinson."

The following morning, the snakes were released at their respective capture sites without incident. We never saw three of them again. If we had never seen all four of them again, this article could not have been written.

Through the magical process of writing, coupled with the value of temporal depth with the study under discussion, we move forward in time to 3 September 2005. I'm with Gordon Schuett. If a man is judged by the company that he keeps, I have heaven assured on this day (at least the low-rent district). We start at 0605 hours. We dig up three suspected atrox nests, and

score the shed skins of three neonates with the last dig. We next snag and bag female Ca47, who is in need of a transmitter replacement surgery. Our next hit will be the matriarch of our study, Ca1. We have had her on the electronic string since 16 March 2001. She is also due for a surgery. If we catch her up, we are going to catch her.

It is hard to describe the thrill of finding a pair of atrox swirling about each other on an open sandy wash bottom in the surreal glow of a glorious September morning. Said thrill is especially acute when one of those atrox is one that has been watched and admired for over four years. *Crotalus atrox* #1, Ca1, was the noun in our sentence, the jam in our jelly roll, and the queen and epicenter of our atrox study. I was so fond of her that I named her Ruth, after my own sweet mother. Meanwhile, her suitor—the future apple of our eyes—was doing everything he could to get into my mother's pants. He had her tail encircled with his own while he engulfed her with the rest of his body. He was lavishing her with powerful constrictions and releases, vigorous chin rubs and tongue licks along the entire length of her body, the whole while clenching and methodically massaging her tail with his.

So close to a full-blown game of hide the baloney were they that I wrote "Pairing and full coitus" on the datasheet. My mother's namesake was getting laid, and happy I was for her. However, after a few years of all out war between a staunch physiologist and an equally staunch naturalist, an agreement had been reached. It was to become the first commandment of the Suizo Mountain Project. Said first commandment went something like "Thou shalt not disturb screwing rattlesnakes." Hence, even though Ruth was due a transmitter change, it appeared she was about to be saved from the scalpel by virtue of his sword, so to speak.

It remains unclear to me this day why the pair suddenly parted before our very eyes. As observers, Gordon and I were keeping our distance, and doing our utmost not to distract the festivities. Nevertheless, the tall and short of it is that our presence was likely the impetus that spooked them. Whatever the reason, once they parted ways, the first commandment of the Suizo Mountain Project went right out the window. It was all out war, and we divided and conquered. A few seconds later, we had two separate wiggling and noisy gunny sacks in our hands. Our PIT tag reader was applied to the sack containing Ruth's suitor. Up popped a nine-digit number. The chief scribe of the study then proceeded to whip through four hard copy pages of current PIT tag numbers affixed to his clipboard. Less than a minute later, we knew with certainty which atrox this was. He was Ca55—the male in Figure 1.

My, how he had grown during the 1.5-year interlude between March 2004 and September 2005! His SVL was 158 mm (~6.22 inches) longer, his tail had grown 13 mm (~0.51 inches), and his mass increased by a whopping 248 g (~8.6 ounces). It is interesting to note that his girlfriend Ruth had grown only 20 mm (0.75 inches) SVL during the same time period. Ruth was a much older snake, long past any reckless growth spurts that may have occurred in her early years. Our boy Ca55 seemed to like women that were on the mature side of life. It should also be noted that at the point of recapture, he was 791 m southeast of



Figure 2. Often on the move, Ca55, AKA Doublenicks, heads toward (lefthand image) and away (righthand image) from Iron Mine Hill.

where he was first captured and processed. While that distance could hardly be considered a mega-move for an up and coming young buck, it is certainly impressive enough to mention.

For once, we had some transmitters to spare. The decision to put one in Ca55 was a no brainer. We already had 1.5 years of instant growth data on him, and he was just viewed courting our longest running female atrox. He could prove to be an interesting study subject. The following day, the surgeries were performed, and both snakes were released together. The pair showed no immediate interest in each other on release. They may have gotten back together after we left, but that prognosis is based largely on nothing but wishful thinking. Two weeks later, they were over 500 m apart.

For nearly two months, we did not actually see Ca55. Thanks to the electronic junk blipping away in his innards, we could always find him. But that does not mean that we got to see him with every tracking episode. On 8 October, he was buried out of sight in a soil mound situation. He was still buried there on 15 October. By 22 October, he had moved roughly 100 m, and was again buried out of sight under a healthy prickly pear. At our approach to this new site, a massive Pack Rat (*Neotoma albigula*) fled into the same soil hole that Ca55 had likely utilized for an entrance hole. Gordon and I estimated the mass of that rat to be ~200 g (~7.1 ounces), which is as big as they get here. A lot of beef charged into that snake's lair that morning, and we understood the reason that our new boy was hanging around the place. On 29 October, he was still there, but still not visible. There was no sign of the rat. Without benefit of X-ray vision, we could do little but hope that Ca55 had converted that nasty rat into snake mass.

My next tracking session with Ca55 was 6 November, at 0834 hours. He was up, he wasn't alone, and I got a picture! His distended flanks indicated a recent meal, which may or may not have been the big Pack Rat discussed in the paragraph above. In any case, a fat male is a randy male, and at the point of my arrival, it appeared that he was just crawling off the top of another stacking episode. Before going any further, it should be mentioned that I had now seen Ca55 a grand total of three times over a 1.5 year plus time period. In all three cases, he was with a different lady. What a guy! With this pairing, he was viewed

crawling off the top of his lady, who was a shy young thing. She was hiding her head from him, but her tail was very closely aligned with his. There was no doubt that they had spent a cold autumnal evening together, he coiled on top of her, and it was just warming up enough for him to move on. While pairings in November commonly occur at the aggregate dens, they are highly rare over 500 m away from the closest possible overwintering structure. Indeed, this particular pairing is the latest in the year we have ever observed out on the bajada. Ca55 was beginning to establish himself as a most interesting subject. I was already feeling a strong attachment for this snake.

We kept him in the study for nearly three more years. If we highlighted every tracking episode that occurred during this time period, we would have a book length epic that would no doubt cause both reader and author alike to lapse into a coma. Instead, we will jet through the events of his life, giving pause for clutch observations along the way. We start this process with his given name. Ca55 is an awkward name to work with. We eventually dubbed him "Double Nickels," which was later shortened to "Doublenicks."

Just after his November 2005 pairing, Doublenicks headed back for Iron Mine Hill. He holed up alone near the southern base of the hill, under a massive chunk of granite. While he was alone in his overwintering site, there were other atrox in nearby structures that were less than a one minute crawl away. Despite his reputation as a lady's man, we did not catch him paired with anyone through the entire active season of 2006. What we did notice was that he was well traveled, always on the go, and always looking good in the process (see Figure 2). We always note health on the datasheet when we get a visual on the animal we are tracking, and Doublenicks received the two highest assessments throughout 2006. In November of 2006, he entered aggregate atrox den #4, or AD4, which had been under my watch since 1999. There were two transmitted female atrox using this den in 2006, and he no doubt had ample time to bond with them. It should also be mentioned that Doublenicks entering and overwintering here with several other atrox reveals that he was now playing with the big boys. Without going too deep into the social aspects of aggregate denning atrox, it is something only the large adult males commonly do. As Doublenicks was now himself a large adult male, it was his rite of passage



Figure 3. (Left) 6 November 2005. Doublenicks crawling off an unknown female. (Center) 19 September 2007 (nearly two years later). Whenever the author focuses on data of a lone subject, new things come to light. While gathering the data and images for this article, close attention to detail with the female's tail revealed that Doublenicks has likely found the same female as the one in the left image. (Right) 28 September 2007. Nine days later, he is still with her, still wooing her. It remains unknown if full copulation between the pair ever occurred

into the world of mature *atrox*. In short, this boy was now a man.

By mid-March, he jetted out of AD4 and into his summer range. He left the den before the ladies even came out to play. But by mid-April, he made an unprecedented move of over 800 m back to the den. While we never saw him paired with any of the ladies there, it is likely that this move back was performed with them in mind. The reader must keep in mind that on average, we only spend about 15 minutes per week with each animal under watch. This leaves a whole lot of time for things to happen that we never get to see.

On 12 May 2007, he was up, and due for a transmitter change. He was captured without incident, and processed with the same precision as described above. His SVL was now 990 mm (~39 inches), his tail was 80 mm (~3.15 inches), and his mass was 687 g (~24.5 ounces). If we go back to his original capture 38 months previous, his SVL had increased by 230 mm, or just over 9 inches. His tail length had increased by 15 mm, or 0.59 inches. His mass was now over twice as great as when originally captured! He was now approaching seven years of age. There are several reasons why the Western Diamond-backed Rattlesnakes (*Crotalus atrox*) are the most prolific vipers in our region. Rapid growth is but one reason for their success, but it is an important reason. As Gordon is fond of saying, “They live life in the fast lane.”

Doublenicks was back in the game shortly following the surgery. On 19 September 2007, he was found and photographed in courtship with what was likely the same female as he was with on 6 November 2005. As all *atrox* look very much alike, it is difficult to ascertain if an unmarked/unprocessed snake is a recapture. The true expert at identifying individual *atrox* goes by the tail markings, which are akin to fingerprints in humans. The tail markings, the rattle count, and the location all strongly indicate this female to be the same as was involved with the 6 November 2005 pairing (see Figure 3). Look at the female's tail patterns in these images, as well as the rattle length. The caption in Figure 3 tells the rest of Doublenicks's love affair with this female in the year 2007. She certainly wasn't “easy.”

The remainder of the story of 2007 and early 2008 for young Doublenicks could be compared to a fart on a hot griddle. He was here, he was there, he was everywhere. In November, he bopped back to AD4. By mid-January, he shifted about 30 m (~100 feet) to another winter *atrox* honey hole. By early March,

he had jetted clean out to his summer range, close to where he had been twice-busted with one of his girlfriends. And on 29 March 2008, my jaw dropped it was noted that he had crossed the big road. He had just done something that no other animal had attempted in the previous 7 years of our study. He crossed the big road!

We haven't talked about the big road yet, have we? *What* big road, you might ask? How polite of you to provide the perfect segue to what comes next. Thank you. There would be little point in discussing the big road prior to this moment, as up until now, there was no reason to do so. Now is the time. There is a big road located roughly 800 m (~0.5 miles) to the south of Iron Mine Hill. The big road is an 18-mile stretch of pavement that connects two major highways. From March of 2001 until this moment in 2008, not a single one of over 50 subjects had crossed it. For seven years, it was felt that that our subjects looked at this here big road as a line of demarcation. So far—but no farther. The north of the big road is yours, the south is not. Until Doublenicks came along to shatter that myth, the statistics were pointing heavily toward our line of demarcation hypothesis.

There is one other detail about the big road that is worth mentioning here. The big road is lined on both sides by a barbwire fence. A five strand barbwire fence, to be more exact. As one who crosses most barbwire fences with impunity, the five strands strike fear in my heart—as well as other parts of my anatomy. There are far too many unpleasant memories of crotch-riding the wobbly top fifth strand, while my legs festoon themselves to either side of the various lower strands, to ever try it again.

On this fine late March day, the signal had led me all the way to the north side of this fence. Said signal was faint enough for me to know that if I kept following it, I would have two such five-strand barbwire fences to cross. The choice was simple. Risk castration twice, or hike the opposite direction to my vehicle. The latter choice was made, but the flandickery that this decision set up was legendary. Castration may have been preferable. I had to hike a mile back to said vehicle, and bang my way up rutted roads that led to a gate through that miserable fence. Mention should be made that when driving alone, a gate sets up its own series of exhausting challenges. This is especially true where Arizona gates are concerned. They are not really worthy of being called gates. They are more like a tapestry of rusty



Figure 4. 14 June 2008. An envenomated Desert Spiny Lizard's last gasp? Shortly after this image was taken, Doublenicks devoured the prey item.

tetanus wrapped around whatever wooden posts might be available, and stretched to the tensile limits of the wire across the road. Hence, the usual drive, park, hop out, open gate, hop in, drive through, park, hop out, close the gate, and hop back in ensued. Yegads! The crap we go through to help the ranchers overgraze our desert is amazing!

The remainder of the tracking session was rather serene, peaceful, and long. On and on it went, until at length I found myself standing before the coiled form of Doublenicks. He was coiled in a little cul-de-sac among a nasty little patch of Fiddle-necks, under the canopy of a Palo Verde Tree. He had traveled an astounding 1057 m in a southeasterly direction to get there. It remains the longest move that any atrox under our watch has ever made. On 5 April 2008, less than a week later, he was back on the north side of the big road again, where he remained for several months.

On 14 June, at 0630 hours, he was viewed sprawled lengthwise, the front half of his body in 70% diffused but direct sunlight, emerging onto open bajada from beneath the depths of a Creosote. His snout was nearly touching the tail tip of a large adult male Desert Spiny Lizard (*Sceloporus magister*), which was laid out nearly ramrod straight in front of him. As stated, the lizard was large, roughly 20 cm (~8 inches) in total length, and likely was pushing 30 g in mass. I knew it was a male because he was in his full regalia of foreshummer breeding colors. I snapped a few photos, and dutifully wrote it all up. For 18

minutes I watched for developments, of which there were none. Neither animal moved a muscle. I assumed that the lizard was dead, and Doublenicks was playing the all-too familiar game of "will you just *leave*?" with me. Meanwhile, the waiting game gave that burning-ass orb in the June sky another 18 minutes to rise. All shade evaporated, and the observer and observed alike were now in direct sunlight. It was starting to cook, and I was burning valuable daylight watching nothing. As there was another hard-wired rattlesnake nearby, I decided to track it down, and hopefully come back in time to see more. This was done with great haste and efficacy, and I returned at 0708 hours—38 minutes after the initial encounter. Absolutely nothing had changed!

But as I watched on, Doublenicks began tongue-flicking the lizard while moving slowly up its right flank. The lizard shuddered violently at the point where Doublenicks had reached its mid-flank. It was still alive! While there were no outward signs of envenomation, the lizard had obviously been nailed by our boy. Following the shudder, the lizard threw its mouth open wide, and its tongue was thrust upward and outward. The gaping posture was held for about ten seconds, and then the mouth slowly closed again. Was this a silent scream of some sort? Or perhaps an effort to gulp air? Maybe an act of defiance to predator and/or observer alike? A full minute passed, nobody moved, and then, once again the lizard repeated the gape. At the point that the second gape had ensued, I took a knee, steadied my camera, and waited to see if I could get the money shot. And sure enough, he gaped on more time. Click—gotcha (Figure 4). It appeared to be his last gasp. Once again, the silent snake flipped me some attitude. "I ain't going to eat this lizard until you *leave*!" I took the hint, and at 0711 hours I walked a semi-circle, hoping to arrive back in time to find Doublenicks choking it down. But I tarried just a tad too long with my stroll. When I got back to the scene at 0733, Doublenicks was on the crawl across the bajada, roughly two meters from where the lizard had been. A very subtle food bolus distended his flanks. While I had missed a photo opportunity, I had captured a feeding event. Team Schuett and Repp had long surmised that with the rattlesnakes under our watch, there were *far* more feeding events than what we witnessed occurring. We usually could only rely on a food bolus to tell us of a recent meal. If the snakes under watch were getting large meals, we noticed. But unless we



Figure 5. 26 July 2008. Doublenicks earns a new name, "The Road Warrior." It took him six minutes to cross the paved road. Three minutes later, an 18 wheeler whizzed by the far lane that he had just occupied.



Figure 6. 4 August 2008. The last image of the Road Warrior in life.

actually see them eat, any small bolus would like as not go undetected. The incident just described gave us a glimmer of the fact that they *do* consume small meals. But who cares about that? The incident just described falls under “really cool,” and that is what we all live for. And my bond with Doublenicks grew as a result. He was hands down my favorite male atrox of the study.

On the morning of 26 July 2008, Doublenicks was officially renamed. He became “The Road Warrior.” I found myself on the north side of that god-awful five stranded barbwire fence. The blipping from my receiver told me I was close, but he was beyond that fence. And then I saw him. He was sprawled out nearly straight, his snout less than a meter from the north edge of the pavement of the big road. I knew what he was going to do next, but there wasn’t a damn thing I could do about it but watch. Out came the data sheet and my camera. Whatever happened next, it would be dutifully recorded by the scribe. At precisely 0638, he began to crawl across the pavement. He acted like he had all the time in the world, his pace was agonizingly ponderous. He paused in the center lane of the westbound stretch of the big road to carefully tongue-flick the pavement. He then continued to the center lane of the eastbound stretch, where he again paused overly long to taste pavement. From the west, I heard the approaching thunder of the horseman of the apocalypse coming his way. While I was outwardly calm, inside, I was screaming “Move it, dumbass! You have *no idea* how close to death you are!” At exactly 0644, the Road Warrior slipped safely onto the south shoulder of the big road. It had taken him six minutes to cross. At 0647, an eastbound 18 wheeler roared past me. Three minutes was all that separated the apple of my eye from being a bloody grease stain on the pavement (see Figure 5).



Figure 7. 10 August 2008. Some vertebrae and a transmitter found on the north side of the road signify the untimely end of the Road Warrior.

The next time I tracked the Road Warrior was the evening of 4 August, nine days after his harrowing crossing. He was coiled in an ambush-style hunting posture (see Figure 6), and he was again on the north side of the big road. This meant that at some point during that nine-day separation, he had crossed that big road again. I left him with a verbal warning “Stop crossing that road—*idiot!*” But he of course did not listen. Road Warriors do not listen to scribes.

Six days later, I was staring at two lengths of rattlesnake vertebrae and a transmitter on the north shoulder of the big road (see Figure 7). The Road Warrior was dead, and I wasn’t feeling so good myself. While I have no way of truly knowing exactly what happened, the clues left behind indicate a snake that was greased on the road, and then tossed aside. “Gawd—it’s just another dead atrox. Get it off the road, and let’s keep going.”

If there is a lesson in this, that lesson might be one of respect. When you look at that mangled mess at your feet, give pause to think of what might have gone down with that animal’s life before its untimely demise. In the case of the Road Warrior, we know that he was *not* just another atrox.

The Road Warrior had no way of knowing that the big road was a two-edged sword. He could not understand that the road giveth, and the road taketh away. You live by the road, you die by the road. Blessed and cursed be the name of the road.

Rest in peace, Great One, and know that you will always be in my heart.

This here is Roger Repp, signing off from Southern Arizona, where the turtles are strong, the snakes are handsome, and the lizards are all above average.

Herpetology 2016

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

OLDEST KNOWN MARINE TURTLE?

E. A. Cadena and J. F. Parham [2015, *PaleoBios* 32:1-42] note that recent studies suggested that many fossil marine turtles might not be closely related to extant marine turtles (Chelonioidae). The uncertainty surrounding the origin and phylogenetic position of fossil marine turtles impacts our understanding of turtle evolution and complicates attempts to develop and justify fossil calibrations for molecular divergence dating. The authors present the description and phylogenetic analysis of a new fossil marine turtle from the Lower Cretaceous (upper Barremian–lower Aptian, >120 Ma) of Colombia that has a minimum age that is >25 million years older than the minimum age of the previously recognized oldest chelonoid. This new fossil taxon, *Desmatochelys padillai* sp. nov., is represented by a nearly complete skeleton, four additional skulls with articulated lower jaws, and two partial shells. The description of this new taxon provides an excellent opportunity to explore unresolved questions about the antiquity and content of Chelonioidae. An updated global character-taxon matrix is presented that includes *D. padillai* and marine turtles known from relatively complete specimens. Analysis supports *D. padillai* as sister taxon of *D. lowi* within Protostegidae, and places protostegids as the sister to Pan-*Dermochelys* within Chelonioidae. However, this hypothesis is complicated by discrepancies in the stratigraphic appearance of lineages as well as necessarily complicated biogeographic scenarios, so the authors consider the phylogeny of fossil marine turtles to be unresolved and do not recommend using *D. padillai* as a fossil calibration for Chelonioidae. They also explore the definition of “marine turtle,” as applied to fossil taxa, in light of many littoral or partially marine-adapted fossil and extant lineages. They conclude they can confidently say that *D. padillai* is the oldest, definitive, fully marine turtle known to date. [This study was supported in part by a CHS grant.]

MELANISM IN MALE RED-EARED SLIDERS

M. E. B. Stone et al. [2015, *Journal of Herpetology* 49(4): 574-578] note that male sliders change coloration ontogenetically, becoming melanistic as they age and approach the body size of sexually mature females. Several investigators have suggested that melanism is favored by sexual selection, although there is little evidence to support this hypothesis. Experiments were conducted in enclosures to test whether melanism in male red-eared sliders (*Trachemys scripta elegans*) is a visual signal favored by sexual selection. In female preference trials, females showed no preference for either nonmelanistic or melanistic males. Melanistic and nonmelanistic males associated together instead of being aggressive toward each other in trials testing male–male competition. Neither result supports the hypothesis that male melanism is a product of sexual selection. Observations of non-aggressive interactions between melanistic and nonmelanistic males suggest that melanism in male slider turtles may function as sex recognition to avoid mistaken courtship of large males.

INSECTICIDE AND FUNGAL EXPOSURE

S. L. Rumschlag and M. D. Boone [2015, *Herpetologica* 71(3): 169-176] note that effects of pathogens on host life-history characteristics can be influenced by changes in the immune system that occur during development as well as by environmental factors that negatively affect immune system function. Amphibians worldwide are experiencing population declines from chytridiomycosis caused by the fungal pathogen *Batrachochytrium dendrobatidis*. Disease outbreaks can be influenced by timing of exposure to *B. dendrobatidis* and by abiotic factors, such as pesticides, that could influence susceptibility. To examine the effects of larval pesticide exposure and timing of *B. dendrobatidis* exposure during development, the authors exposed Cope's gray treefrogs (*Hyla chrysoscelis*) to the insecticide malathion throughout larval development and to *B. dendrobatidis* at 1 or 3 wk posthatching, or after metamorphosis. They reared tadpoles through metamorphosis and then for 28 d in the terrestrial environment to examine treatment effects on larval survival, time to metamorphosis, and mass at metamorphosis, as well as terrestrial survival and growth after metamorphosis. Malathion exposure resulted in a decrease in mass at metamorphosis and a decrease in terrestrial growth. Exposure to *B. dendrobatidis* did not influence larval development, terrestrial growth, or survival, and exposure to malathion appears to not have altered the effects of *B. dendrobatidis* exposure in a biologically significant way.

INVASIVE BOAS ON ARUBA

J. M. Goessling et al. [2015, *Journal of Herpetology* 49(3): 358-363] note that the island of Aruba is home to several endemic species, and has been colonized recently by the invasive boa, *Boa constrictor*. They present data for a multiple-year sampling effort on one of Aruba's endemic species, the Aruban whiptail lizard (*Cnemidophorus arubensis*). Sampling began before the invasion of *B. constrictor* and ended after their firm establishment, thus affording a unique opportunity to document the potential effects of this invasive snake on the endemic lizard. Additionally, the authors compare their data with earlier studies with an average lizard density of 235.1/ha (SE = 73.42, n = 11). After the invasion of *B. constrictor* densities of *C. arubensis* were as high as 2,185/ha. Although *B. constrictor* regularly preys upon *C. arubensis*, the relationship between *B. constrictor* and *C. arubensis* likely represents ecological facilitation of the lizard species. The authors develop a hypothesis that may explain how the invasive *B. constrictor* has caused an increase in the population of this endemic lizard. Additionally, they suggest and discuss a few alternative hypotheses that may also account for this observed pattern of increased density. This study identifies a need for continued monitoring of Aruba's native fauna, as well as the need for further experimental approaches to understand the mechanism by which invasive predators ecologically interact with native prey.

EFFECTS OF BLOOD PARASITES ON WALL LIZARDS

I. Damas-Moreira et al. [2014, *Acta Herpetologica* 9(1):119-123] note that nowadays it is widely accepted that parasites play a significant role in the community structures in which they occur, and ultimately upon ecosystems. Furthermore, infection by parasites might be associated with considerable deterioration of individual host fitness. While the apicomplexan parasites belonging to the genus *Hepatozoon* can provoke severe deleterious effects in some mammals, impact on other hosts, such as reptiles, is still unclear. The authors assessed the effect of *Hepatozoon* parasites on *Podarcis vaucheri* flight-initiation distance from a simulated predator, a behavior that is determinant for a successful escape and is therefore likely to have major implications on a lizard's survival. They found that flight-initiation distance was not dependent on the time of the day or tail condition. Subadults exhibited worse body condition than adults and females had worse body condition than males. Regarding intensity of parasitism, subadults showed higher parasitemia levels. Escape distance was not associated with parasitic load or any of the other studied features, which is indicative of limited impact of the parasite. This negligible effect might explain the remarkably high prevalence (> 96%) of this parasitic group within this *P. vaucheri* population. [This study was supported in part by a CHS grant.]

AMPHIBIANS IN SALINE HABITATS

G. R. Hopkins and E. D. Brodie, Jr. [2015, *Herpetological Monographs* 29:1-27] note that amphibians are well known as osmotically sensitive organisms due to their highly permeable skin and eggs and, as such, biologists have mostly discounted their presence in saline environments. Yet, from the 1800s to the present day, scientists have repeatedly found amphibians living and breeding in a variety of saline coastal and inland habitats. Despite this plethora of observations, their presence in these habitats is still mostly ignored, and the last (and only) complete literature review documenting amphibians in brackish and saline habitats was completed over 50 yr ago. The authors provide a review of the literature of amphibians in saline waters and present data on 144 species, in 28 families, on every continent except Antarctica. The case is made that salt tolerance in amphibians may not be as rare as generally assumed. Through classifying habitats and studies, the authors conclude that the abilities of dozens of species to locally adapt to coastal and inland saline habitats have been extensively studied, although more work on most observed species is still needed. Our understanding of the evolutionary processes leading to this adaptation is also in its infancy. The authors summarize the existing knowledge on this subject and present a possible framework toward the development of an evolutionary model of amphibian adaptation to salt, based on genetic variation for salt tolerance in populations and the nature of selection events in osmotically stressful environments. Finally, they discuss some possible limitations on the ability of amphibians to tolerate salt water. Understanding the abilities and constraints of amphibian populations to adapt to salt will become more critical as humans continue to impact the world's freshwater resources through climate change, landscape modification, and pollution, and these habitats thus become increasingly stressful for amphibians.

EFFECTS OF HABITAT FRAGMENTATION

M. P. Anguiano and J. E. Diffendorfer [2015, *Journal of Herpetology* 49(3):420-427] investigated the spatial ecology of the California kingsnake (*Lampropeltis californiae*) in unfragmented and fragmented habitat with varying patch sizes and degrees of exposure to urban edges. They radiotracked 34 Kingsnakes for up to 3 yr across four site types: interior areas of unfragmented ecological reserves, the urbanized edge of these reserves, large habitat fragments, and small habitat fragments. There was no relationship between California kingsnake movements and the degree of exposure to urban edges and fragmentation. Home range size and movement patterns of kingsnakes on edges and fragments resembled those in unfragmented sites. Average home-range size on each site type was smaller than the smallest fragment in which snakes were tracked. The persistence of California kingsnakes in fragmented landscapes may be related directly to their small spatial movement patterns, home-range overlap, and ability to use urban edge habitat.

HAWAIIAN GREEN TURTLE DEMOGRAPHICS

G. H. Balazs et al. [2015, *Chelonian Conservation and Biology* 14(2):119-129] summarize all existing data and knowledge of the demographic variables and their stochasticity of Hawaiian green turtles (*Chelonia mydas*). The population numbers roughly 4000 breeding females today, having rebounded from its near extinction in the early 1970s, with most of the nesting restricted to French Frigate Shoals in the remote and geologically ancient Northwestern Hawaiian Islands. A timeline is provided of the scientific monitoring for this population and associated data streams relating to morphometrics, maturity, nest dynamics, sex ratio, as well as population growth and viability.

TAGGING TADPOLES

L. Bainbridge et al. [2015, *The Herpetological Journal* 25(3):133-140] note that population demographics for amphibian larvae are rarely estimated due to marking technique limitations on small body size, morphological change (metamorphosis), and the associated habitat changes (aquatic to terrestrial environments). A technique that may meet some of these limitations is visible implant elastomer (VIE) tagging. This study reports on the efficacy of VIE tagging a treefrog (Hylidae) at the tadpole stage for cohort identification across metamorphosis to the adult stage, in a field environment. During a preliminary captive trial, post-metamorphosis tag retention was 100% over three months, with no adverse effects observed on survival, growth or time to metamorphosis. During a field study tag retention in recaptured *Litoria aurea* was 95% for tadpoles and 88% across metamorphosis. By 200 days post-tagging, retention declined to 75% in the adult stage and stabilized around 50% by 300 days. Post metamorphosis the retention rate was less reliable and dependent upon sex and life-stage. Females showed the highest retention rate (max. 62%, 760 days post tagging), followed by juveniles (max. 45%, 400 days post tagging) and males (max. 20%, 760 days post tagging). The authors conclude that VIE tagging is a viable method for studying cohort larval movements and population demographics of amphibians up to a 50-day post-metamorphosis stage.

CANE TOADS AS PREY

E. Cabrera-Guzmán et al. [2015, Herpetological Monographs 29:28-39] note that the successful spread of invasive cane toads (*Rhinella marina*) across tropical Australia has been attributed to a lack of biotic resistance, based upon the inability of most anuran-eating vertebrate predators to tolerate the powerful chemical defenses of the toads. However, despite their high species richness, invertebrates have been much less studied than vertebrates as predators of cane toads. The authors' field and laboratory studies show that toads are killed and consumed by a phylogenetically diverse array of arthropod taxa. No arthropod predators consumed toad eggs in their laboratory experiments, but fishing spiders, water beetles, water scorpions, and dragonfly nymphs killed toad tadpoles, and ants and fishing spiders killed metamorph toads. Published accounts report predation on toads by crustaceans and hemipterans also. In the experiments, no predators showed any overt ill effects from consuming toad tissue. Dragonfly nymphs (*Pantala flavescens*) and fishing spiders (*Dolomedes facetus*) selectively took cane toad tadpoles at higher rates than some simultaneously offered native frog tadpoles. In combination with published data, the experiments suggest that the tadpoles face high predation rates from the diverse and abundant invertebrate fauna of aquatic and riparian habitats in tropical Australia. The invasion of cane toads can potentially have positive effects on populations of many native animal species.

PRAIRIE RATTLESNAKE MOVEMENT PATTERNS

J. M. Bander et al. [2015, Journal of Herpetology 49(3):377-387] note that many snake species make lengthy linear migrations between overwintering sites and summer foraging or mating habitats. Although mountainous topography may restrict migratory movements, most previous studies on migratory snake populations have occurred in areas with low to moderate topographic relief. The objectives of this study were to describe the movement patterns of prairie rattlesnakes (*Crotalus v. viridis*) in a mountainous landscape, compare those patterns to those of migratory snake populations from areas with lower topographic relief, and test for variation in movement patterns between sexes and among years. Radiotelemetry was used to monitor the movements of 21 male and 6 nonpregnant female prairie rattlesnakes in the Frank Church Wilderness in central Idaho during the summers of 2006–2008. Mean total distance moved during the entire activity season in 2008 was 4.46 km (range 1.38–7.67); mean maximum distance moved from the hibernaculum was 1.46 km (range 0.69–2.71). Although the movement distances reported here are intermediate to those reported for other migratory snake populations, they are similar to some distances reported from areas with low to moderate topographic relief. This suggests that rattlesnakes are capable of making considerable movements in a mountainous landscape, although factors such as prey availability could also contribute to differences in reported movement distances. Rattlesnakes displayed moderate fidelity to summer activity areas but had similar mean bearings during outbound migration across multiple years. The authors hypothesize that linear migrations reported from rattlesnakes in many populations actually represent the most-direct movement to annual foraging areas rather than true searching movements.

ORNATE BOX TURTLES IN NORTHWEST ILLINOIS

C. R. Tucker et al. [2015, Copeia 103(3):502-511] note that activity patterns of ectothermic animals are affected by weather, time of day, and season, but quantifying these effects can be logistically challenging. An automated radio telemetry system was used to quantify ornate box turtle (*Terrapene ornata*) activity patterns for two years in northern Illinois. Continuously collected activity data were paired with meteorological data collected from the site to determine factors influencing turtle behavior. Temperature, relative humidity, rain, year, month, time of day, and reproductive status affected activity levels. Increased activity levels corresponded with rain events, and males were generally more active than females, especially during spring and late summer. Overall, turtles were less active during an uncharacteristically warm and dry year compared to a year with conditions that were closer to the long-term average. Bimodal daily activity patterns have been reported in more southerly populations, and this study found similar patterns near the species' northern range limit, indicating that thermal constraints may limit activity of this species across its range. Activity comparisons between a year with normal meteorological conditions and an abnormally warm and dry year provide insight to the effect that further onset of climate change may have on the activity of ornate box turtles.

GIANT GARTERSNAKE SURVIVAL PROBABILITIES

E. C. Hansen et al. [2015, Copeia 103(4):1026-1036] note that the loss and modification of freshwater ecosystems has led to high rates of imperilment for freshwater species. The giant gartersnake (*Thamnophis gigas*) is among the species that have suffered declines in abundance and spatial distribution and is currently listed as a threatened species by the U.S. government and the state of California. Conservation and management of populations of *T. gigas* are hampered by a lack of information on its demography. Without estimates of demographic parameters, the status of the population is difficult to characterize, and identifying the parameters to target in management planning is problematic. The authors used capture–recapture data from two populations in the Great Central Valley of California to estimate annual survival probability. They also evaluated hypothesized causes of variation in survival probability among individuals and among years. Model-selection results for the population in the American Basin indicated that females have a higher survival probability than males and that survival probability and the amount of precipitation between 15 April and 15 May in a year are negatively correlated. Associations with other weather covariates were also supported, but the evidence was weaker. For the population in the Natomas Basin, the model-selection results indicated a positive association between survival probability and the body size of an individual (snout–vent length). There was also evidence that females have higher survival probabilities than males, but the support for this effect was weaker. This work fills gaps in understanding of the demography of *T. gigas* by providing estimates of survival probability for males and age classes for which estimates were previously not available.

BANGLADESH TURTLES AND TORTOISES

S. C. Rahman et al. [2015, *Chelonian Conservation and Biology* 14(2):130-135] note that the Chittagong Hill Tracts (CHT) comprises an extensive expanse of hills located in the far south-east of Bangladesh, bordered by India and Myanmar. CHT covers more than 10% of the total land area of Bangladesh and lies within the Indo-Burma Biodiversity Hotspot. Because of political instability and the generally remote nature of this region, it remains as the least explored area in Bangladesh. Very little is known about the chelonian fauna of CHT. The authors investigated the occurrence, conservation status, and exploitation of chelonians in the southern part of CHT, in Sangu-Matamuhuri Reserve Forest and adjacent areas, from 2011 to 2015. During the survey, they obtained specimen-based records of 8 species: Arakan forest turtle (*Heosemys depressa*), Asian brown tortoise (*Manouria emys*), keeled box turtle (*Cuora mouhotii*), elongated tortoise (*Indotestudo elongata*), Sylhet roofed turtle (*Pangshura sylhetensis*), Asian leaf turtle (*Cyclemys* sp.), Malayan softshell turtle (*Amyda ornata*), and Indian flapshell turtle (*Lissemys punctata*). The critically endangered *H. depressa* and the endangered *C. mouhotii* are recorded from Bangladesh for the first time, and the endangered *P. sylhetensis* is recorded from CHT for the first time. Two isolated populations of *M. emys* were documented in the Sangu-Matamuhuri Reserve Forest. No evidence was found of large-scale, commercial turtle harvesting in the survey area. Subsistence hunting is probably the most immediate threat to chelonians in this region. With no intervention, subsistence hunting will likely cause large-scale local extirpation of extant, low-density populations. Considering the species diversity and the opportunities for long-term conservation, CHT may be considered to be a priority site for conservation of these species in danger. To mitigate turtle hunting, the authors recommend a bottom-up, community-based conservation model, the foundation of which should be based on trust, traditional ecological knowledge, community participation, and ecological science.

REPRODUCTION OF CAPTIVE GIANT SOFTSHELLS

Zhu Xinping et al. [2015, *Chelonian Conservation and Biology* 14(2):143-147] note that the Asian giant softshell turtle, *Pelochelys cantorii*, is endangered and has been designated as a first-grade protected animal in China. They report the results of a study on the reproductive biology of Asian giant softshell turtles. Two individuals, a male and a female from the Suijiang River in Guangning County, Guangdong Province, were introduced into captivity 8 yrs ago. The two turtles have engaged in mating activity since April 2014, and the female laid a total of 66 eggs in 2014 (25 eggs on 15 June, 22 eggs on 30 June, and 19 eggs on 14 July). The egg laying took an average of 50.6 min. Egg shape was spherical, and mean ($\pm$ SD) egg mass was 13.27 ± 0.97 g, with mean diameter 2.90 ± 0.12 cm. The viability rate was 46% and the hatching rate 33%, and only 10 neonates successfully hatched. Hatchling body weight averaged 10.0 ± 0.56 g, carapace length averaged 42.25 ± 3.69 mm, carapace width averaged 40.25 ± 1.58 mm, and carapace height averaged 12.54 ± 0.91 mm. The juvenile turtles differed from the adults in body color. The juvenile plastron is white; carapace, head, neck, and limbs have some small irregular black and pale yellow spots.

DIET OF NONNATIVE FROGS ON MAUI

R. B. Ferreira et al. [2015, *Journal of Herpetology* 49(4):586-593] note that the greenhouse frog (*Eleutherodactylus planirostris*) is one of the most widespread frog species in the world. Because of its high population densities, widespread distribution, and consumption of native invertebrates in some invaded sites, understanding its impacts in Hawaii is important. The authors analyzed stomach contents of 397 frogs from 10 study sites in Maui. Results suggest greenhouse frogs are active, ant-specialist predators in the leaf litter. Ants (Formicidae) were the dominant prey found in stomachs in both number and volume. Furthermore, only ants were consumed in a higher proportion than they were sampled in the environment. Because ants dominated their diets, and because all ants are nonnative to Hawaii, this means greenhouse frogs consumed primarily nonnative invertebrates (>80%) in the areas sampled. Although results suggest that most native taxa are not at risk from greenhouse frog predation, the only locations where we could currently find greenhouse frogs were in human-dominated lowlands, which have a lower proportion of native species. Greenhouse frogs may consume more native species if they invade more native-dominated habitat. Alternatively, nonnative ants are known to impact negatively many native invertebrates in Hawaii, and their possible reduction through greenhouse frog predation could affect other species positively. This research highlights the need to understand better the effects of greenhouse frog predation on both native and nonnative invertebrates in Hawaii.

ARBOREAL COVER BOARDS

E. J. Nordberg and L. Schwarzkopf [2015, *Herpetologica* 71(4):268-273] note that arboreal reptiles are often difficult to capture because of their cryptic nature and propensity to flee out of reach when approached. In addition, arboreal lizards often seek refuge under loose or peeling tree bark; therefore researchers often remove it to catch them, thereby potentially damaging habitat. Using arboreal cover boards, or “artificial bark,” might reduce damage to natural shelter sites, allowing repeated surveys. The authors compared capture success and population structure of samples obtained by two capture methods—active searches (visual encounter surveys [VES]) and arboreal cover boards used as artificial bark—on two species of arboreal lizards, inland snake-eyed skinks (*Cryptoblepharus australis*) and dubious dtellas (*Gehyra dubia*). Two types of arboreal cover boards (cardboard and closed-cell foam) were strapped around the main trunks of trees with elastic straps. Systematic VES during the day (for *Cryptoblepharus*) and at night (for *Gehyra*) were conducted in conjunction with monitoring of arboreal cover boards. Diurnal VES for *Cryptoblepharus* had low capture success (17.1% of observed animals) compared to arboreal cover boards (49.6%). Nocturnal spotlight surveys for *Gehyra* resulted in a high number of observations, but low capture success (44.9% of observed animals) compared to arboreal cover boards (83.5%). There was no difference in the capture success between cover board materials. Using arboreal cover boards as artificial bark increased hand captures of arboreal lizards, and preserved natural bark shelters that would have otherwise been destroyed by peeling bark during visual encounter surveys.

Unofficial Minutes of the CHS Board Meeting, January 15, 2016

President John Belah called the meeting to order at 7:55 P.M. Board members Brandon Ottolino and Jessica Wadleigh were absent.

Officers' Reports

Recording secretary: Minutes from the December 18 board meeting were read, corrected and accepted.

Treasurer: Andy Malawy has met with Amy Sullivan to assist her with taking over the treasurer position. The financial report was reviewed.

Membership secretary: Mike Dloogatch read the list of expiring memberships. Wildlife Discovery Center got 3 institutional memberships. Membership stands at 430.

Corresponding secretary: It was noted that there is no longer a CHS cell phone.

Sergeant-at-arms: There were 19 in attendance at the December holiday meeting.

Committee Reports

Shows:

- Notebaert Nature Museum, first full weekend of each month.
- Chicago Outdoor Sports Show, Rosemont Convention Center, January 20–24.
- Chicagoland Fishing, Travel and Outdoor Expo, Schaumburg Convention Center, January 28–31.
- Chicago Family Palooza, Pheasant Run Resort, St. Charles, February 27–28.
- Kids Expo, Schaumburg Convention Center, February 27–28.
- Chicagoland Family Pet Expo, Arlington Park Racetrack, March 18–20.
- NARBC, Tinley Park, March 19–20.

Donations at shows cover most expenses for volunteers. Dick requested a \$100 advance. Motion passed.

Junior herpers: 32 attended this month. February topic—iguanas.

Library: Colleen asked for some books on husbandry suitable for children. There was discussion of having several people review the current collection and help weed out outdated materials. John Archer suggested again to make UVB meters available through the library so people could test their UVB bulbs. It was thought that people could bring their bulbs to the general meeting and test them there. A motion to authorize spending up to \$180 for a meter was passed.

Old Business

ReptileFest: An organizing meeting is planned for January 30, probably at Andy Sagan's house. John Archer will send out information. He is trying to anticipate any potential problems that might arise with the new venue. There was discussion of the need to find new volunteers and people to help out with various tasks at the event.

Midwest Herp Symposium: Target date is Sept. 23. There was discussion of all the things that need to be done to present the symposium. This included finding a venue (John Archer), speakers (John Belah), PR (web page), registration (on line and on site), hospitality room, emcee and set up for speakers, sponsors, printed program. The auction and banquet also need to be arranged and possibly a brunch or workshops on Sunday. It was suggested that Don Wheeler be asked to design a T-shirt and Kim Klisiak a flyer. Dick will work on inviting past presidents.

Bylaws: John Archer would like to change Article V, which specifies the officers of the society. He suggested decreasing the number of secretaries and changing the title of the publications secretary to something that covers all media. He also suggested revising Article VII, which covers the board of directors. He recommends decreasing the number of members-at-large to two. He will email his recommended wording to all board members for review.

New Business

Dick Buchholz wants to have a CHS history table at the general meetings. He is asking for any memorabilia to display.

The U.S. Fish and Wildlife Service is going to adopt a new rule prohibiting the importation of 20 genera of salamanders from outside the country and the transportation of those genera across state lines. This is in response to the spread of chytrid fungus in Europe. There is now a 10-day comment period.

Grant proposals: Mike Dloogatch moved that up to \$10,000 be allotted for the grants committee to spend this year. This is in line with past years. The motion passed unanimously.

Dick stated that the tables provided by the museum for the Notebaert shows are in poor condition and potentially hazardous. He proposed the CHS buy 6 new tables to replace them. Amy Sullivan suggested talking to someone at the museum first.

The meeting adjourned at 9:20 P.M.

Respectfully submitted by recording secretary Teresa Savino

News and Announcements

2016 CHS GRANT RECIPIENTS

The CHS Grants Committee has chosen the CHS grant recipients for 2016. The committee consisted of John Archer, Michael Dloogatch, Robert Jadin, Sarah Orlofske, Amy Sullivan and Steve Sullivan. This year we received 20 applications. After a difficult decision process, 8 grants were awarded, in varying amounts, as follows:

- Kelly L. Barnhart, Biology Department, University of Massachusetts Boston. “Priming Immune Function of Critically Endangered Panamanian Golden Frogs Prior to Reintroduction,” \$1,000.
- Nolan Bielinski, Department of Biological Sciences, University of Illinois at Chicago. “Recording the Soundscape of Frog Habitats in Chicago’s Fragmented Landscape,” \$500
- Grover J. Brown, Department of Biological Sciences, University of Southern Mississippi. “The Evolutionary History of Two Species of Musk Turtles (*Sternotherus carinatus* and *S. minor*) and Implications for Conservation,” \$1,000.
- Hilary Frandsen, Department of Biological Sciences, University of Texas Rio Grande Valley. “Determining the Genetic Diversity of Kemp’s Ridley (*Lepidochelys kempii*) Sea Turtles Using Mitochondrial Genomes,” \$1000.
- Jennifer McKenzie, Department of Forestry, University of Kentucky. “Effects of Snake Fungal Disease on Natricine Snakes Across an Urban-rural Gradient,” \$1,000.
- Freya E. Rowland, Division of Biological Sciences, University of Missouri. “Subsidies and the Balance of Green and Brown Energy in Pond Food Webs,” \$1,000.
- Mark Sandfoss, Department of Biology, University of Florida. “Rates of Water Flux in a Unique Insular Population of Pitviper,” \$1,000.
- Monica Winebarger, Biology Department, Appalachian State University. “Signaling Function of Coloration in Plethodontid Salamanders of Southern Appalachia,” \$1,000.

ReptileFest 2016

The Beasts Awaken (or maybe not)

We don’t care if your animals are awake or asleep as long as people can see them. We’re on a mission in the CHS. We’re trying to educate people about the animals that so fascinate us by showing them up close and personal. Sure we’ll have lots of animals interacting with the public, but display-only animals are just as important. We need that frog or that chameleon and YOU talking about why you care about them and why everyone should. It’s important and it’s fun. Just be there!

April 9 & 10

Northeastern Illinois University
Physical Education Complex
3600 W Foster Ave, Chicago

Sign up to exhibit at: <http://chicagoherp.wix.com/reptilefest#!get-involved/crxa>

Advertisements

For sale: **highest quality frozen rodents.** I have been raising rodents for over 30 years and can supply you with the highest quality mice available in the U.S. These are always exceptionally clean and healthy with no urine odor or mixed in bedding. I feed these to my own reptile collection exclusively and so make sure they are the best available. All rodents are produced from my personal breeding colony and are fed exceptional high protein, low fat rodent diets; no dog food is ever used. Additionally, all mice are flash frozen and are separate in the bag, not frozen together. I also have ultra low shipping prices to most areas of the U.S. and can beat others shipping prices considerably. I specialize in the smaller mice sizes and currently have the following four sizes available: Small pink mice (1 day old—1 gm) , \$25 /100; Large pink mice (4 to 5 days old—2 to 3 gm), \$27.50 /100; Small fuzzy mice (7 to 8 days old—5 to 6 gm) , \$30/100; Large fuzzy mice / hoppers (10 to 12 days old—8 to 10 gm), \$35/100 Contact Kelly Haller at 785-234-3358 or by e-mail at kelhal56@hotmail.com

For sale: Standard 24" Neodesha reptile cages, 3 × 6" vent on top, tempered glass front. Like new condition, no burns or stains, original glass. These cages do not have the dam (horizontal molding that crosses the entire front width of the cage, used to hold back bedding material)—easier to clean without the dam. About 20 currently available, \$45 each. Linda Malawy, (630) 717-9955, linda_malawy@hotmail.com.

For sale: High quality, all locally captive-hatched tortoises, all bred and hatched here in the upper Midwest. Baby leopards, Sri Lankan stars, and pancakes usually available, and are all well-started and feeding great! Leopards are \$125 ea., Sri Lankans (2012 hatched) \$475 ea. And Pancakes are \$195 ea. Leopards for out of state sale/shipping require a veterinary health certificate (inquire for cost). E-mail at KKranz1@wi.rr.com or call Jim or Kirsten at 262 654 6303.

Herp tours: **Costa Rica herping adventures.** Join a small group of fellow herpers for 7 herp-filled days. We find all types of herps, mammals, birds and insects, but our target is snakes. We average 52 per trip, and this is our 10th year doing it. If you would like to enjoy finding herps in the wild and sleep in a bed at night with air-conditioning, hot water and only unpack your suitcase once, instead of daily, then this is the place to do it. Go to our web-site <http://hiss-n-things.com> and read the highlights of our trips. Read the statistics of each trip and visit the link showing photos of the 40 different species we have found along the way. E-mail at jim.kavney@gmail.com or call Jim Kavney, 305-664-2881.

Line ads in this publication are run free for CHS members — \$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to mdloogatch@chicagoherp.org.

From the company that developed the **first UVB lamp** for reptiles 20 years ago...

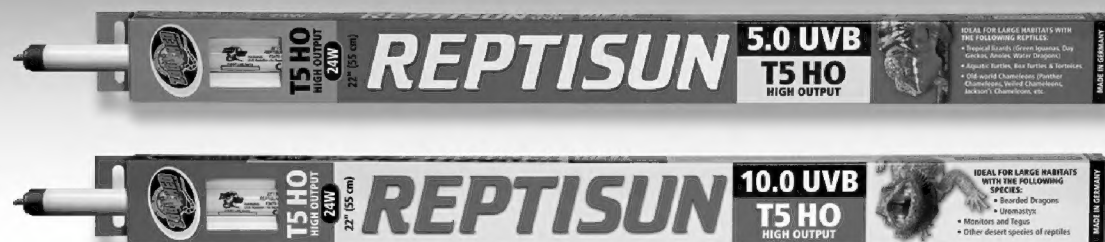
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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, February 24, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **Sam Fellows** will speak on “Pursuit of Royalty: Searching for Queensnakes in Wisconsin.” Sam graduated from the University of Wisconsin–Milwaukee in 2012 with a degree in Biological Sciences. Since graduating, he has worked for the Wyoming Department of Game and Fish, and for the Milwaukee County Parks Department.

Gerry Salmon will speak at the March 30 meeting on “Saving Herps—One at a Time: Working as a Timber Rattlesnake Monitor on Pipelines and Wind Farms in the Northeast.”

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago’s newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

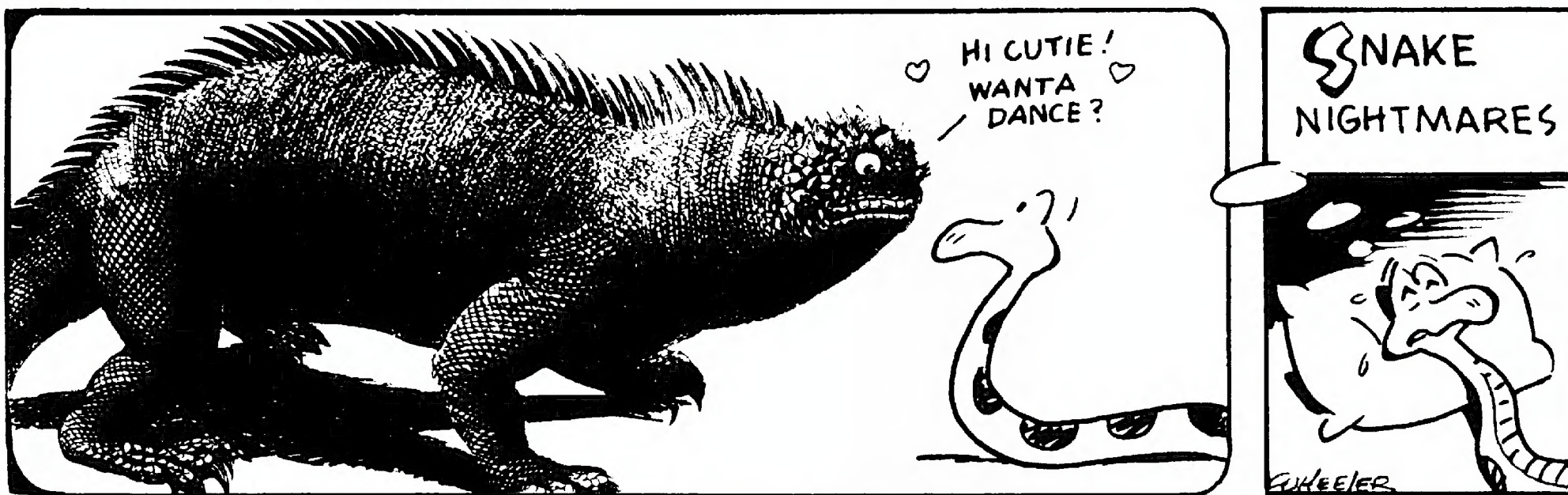
Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., Friday, March 18, 2016, at the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the group’s Facebook page.

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